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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/041,082 | 01/07/2002 | Carl Scarpa | HA-87 (HAL-ID 202) | 2422 |
| 26479 | 7590 | 06/19/2006 | EXAMINER | |
| STRAUB & POKOTYLO 620 TINTON AVENUE BLDG. B, 2ND FLOOR TINTON FALLS, NJ 07724 | | | HYUN, SOON D | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2616 | |

DATE MAILED: 06/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n N .

10/041,082

Applicant(s)

SCARPA, CARL

Examiner

Soon D. Hyun

Art Unit

2616

-- The MAILING DATE of this communication appears n the cover sheet with th c rrespondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 12-18, 21, 22 and 24-31 is/are rejected.
- 7) ☒ Claim(s) 9-11, 19, 20 and 23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/7/2002.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-8, 12-18, 21, 22, and 24-31 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 5-7, 12, 17, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wright (U.S. Patent No. 5809,083) in view of Nee (U.S. patent No. 6,563,786) and Rupp (U.S. patent No. 6,393,068) and N

Regarding claims 1, Wright discloses a method of processing a radio frequency signal comprising a receiver 500 in Fig 5,

receiving the radio frequency signal and calculating a channel estimation and updating it periodically (column 10, lines 24-32) using techniques that are known in the art (column 13, lines 35-37).

However, Wright teaches that that the radio frequency is a single carrier with QAM modulated, i.e., Wright does not explicitly teach the frequency is a sub-carrier (a tone) of OFDM signal.

Nee teaches that an OFDM scheme has an important advantage over a single carrier modulation scheme to reduce inter-symbol interference (col. 1, lines 18-37). Those of skill in the art would have been motivated by Nee to incorporate an OFDM scheme into Wright to take advantage of OFDM. Therefore, it would have been obvious to one having ordinary skill in the art to incorporate into Wright.

Wright also does not explicitly teach a constant modulus based updated operation to update the channel estimation. Rupp discloses a method performing a constant modulus based update operation to update a channel estimate (column 2, lines 31). It would have been obvious to one skilled in the art at the time of the invention to include a constant modulus based update operation in Wright in order to clean up channel estimation for the OFDM carriers.

Regarding claim 2, Wright discloses a method as stated above further comprising a channel compensator 522 Fig 5 that uses the output of the channel estimator to adjust or correct the amplitudes and phases of channel - impaired data symbols (column 10, lines 40-43).

Regarding claim 5, Wright discloses a method as stated above also including a method of detecting the periodic position of differentially encoded pilot words within a symbol stream (column 9, lines 55-58) and extracts the pilot symbols of the differentially encoded words and provides them to the channel estimator 520 Fig 5 (column 10, lines 12-20). The channel estimator compares the amplitudes and phases of the extracted symbols with the expected amplitudes and phases, to thereby estimate the effects of the channel on the

transmitted signal (column 10, lines 24-27).

Regarding claims 6, Wright in view of Rupp discloses a method as stated above that discloses all that is in claim 6 in 25, as stated in the rejections of claims 24 and 1.

Regarding claim 7, Wright discloses a method as stated above that interpolates estimates obtained over multiple pilot periods to generate symbol-specific amplitude and phase adjustments to apply to channel-impaired data symbols (column 10, lines 33-36).

Regarding claims 12 and 24, Wright discloses a method as stated above that also uses a comparator 632 Fig 6 that outputs a number that corresponds to the periodic position of the differentially encoded pilot word, and is used by the pilot symbol extractor 518 Fig 5 to extract pilot symbols of pilot words from the symbol stream. The extracted pilot symbols are then compared with their expected values (threshold) and performs channel estimation and compensation techniques that are known in the art based on the comparison (column 13, lines 28-36).

Regarding claim 17, refer to the discussion for claim 2.

Regarding claim 25, refer to the discussion for claim 6.

4. Claims 18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wright in view of Nee and Koslov (Patent No 5,471,508).

Regarding claims 18 and 21, Wright discloses a method of updating a channel estimate for a carrier signal of an OFDM communication signal as stated above, but does not disclose a reduced constellation decision directed channel estimate update operation to update the channel estimate. However, Koslov

discloses a carrier recover system that uses a reduced constellation slicing method. It would have been obvious to one skilled in the art at the time of the invention to include a reduced constellation slicing method in Wright in order to accurately track variations in frequency and phase that may occur to a carrier (column 13, lines 20-28).

5. Claims 3, 4, 8, 13-16, 22 and 26-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wright in view of Nee and Rupp as applied to claims 1, 2, 5- 7, 12, 17, 24, and 25 above, and further in view of Koslov.

Regarding claims 3, 4, 8, and 13-16, Wright in view of Nee and Rupp discloses all that is stated above, but fails to disclose a reduced or full constellation decision directed update operation.

However, Koslov discloses a carrier recovery system that uses both reduced constellation slicing and full constellation slicing. It would have been obvious to one skilled in the art at the time of the invention to include in Wright a reduced constellation decision directed update and a full constellation decision directed update among the channel update techniques to in order to accurately track variations in frequency and phase that may occur to a carrier (column 13, lines 20-28).

Regarding claims 22 and 26, Wright in view of Nee and Rupp discloses all that is stated above, but fails to disclose an amplitude and phase channel estimate update method for each individual tone, as a function of the signal noise measurement generated. However, Koslov discloses a method using reduced constellation slicing (column 13 lines 20-28). It would have been obvious to one skilled in the

art at the time of the invention to include in Wright in view of Rupp the reduced constellation slicing in order to have a channel estimate that cleans up multipath distortion based on phase and amplitude, since constant modulus only cleans up distortion based on the envelope (amplitude) of the signal.

Regarding claim 30, Wright in view of Nee and Rupp discloses all that is stated above, but fails to disclose a full decision directed channel estimate update module. However, Koslov discloses a system using a full constellation slicing method. It would have been obvious to one skill in the art at the time of the invention to include in Wright in view of Rupp a full constellation slicing method in order to obtain a carrier recovery signal lock.

Regarding claims 27-29, and 31, refer to the discussion for claim 2, 12, and 26.

Allowable Subject Matter

6. Claims 9-11, 19, 20, and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Soon D. Hyun whose telephone number is 571-272-3121. The examiner can normally be reached on M-F.

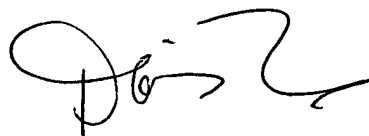
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris H. To can be reached on 571-272-7629. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



S. Hyun
06/09/2006



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